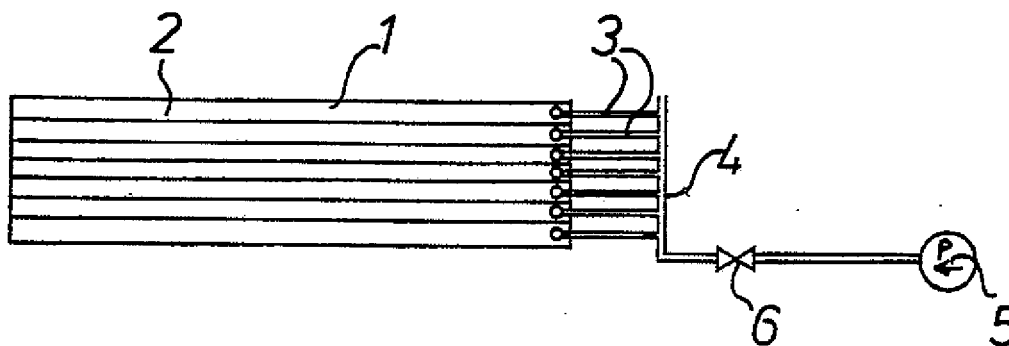


INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/GB80/00114 (22) International Filing Date: 3 July 1980 (03.07.80) (31) Priority Application Number: 7923135 (32) Priority Date: 3 July 1979 (03.07.79) (33) Priority Country: GB (71) Applicant (for all designated States except US): C.J. KIRK (ENGINEERING) LIMITED [GB/GB]; "Whispers", 125 Dukes Ride, Crowthorne, Berkshire RG11 6DP (GB). (72) Inventor; and (75) Inventor/Applicant (for US only): KIRK, Colin, John [GB/GB]; "Whispers", 125 Dukes Ride, Crowthorne, Berkshire RG11 6DP (GB).		(74) Agent: SHEADER, Brian, Norman; Eric Potter & Clarkson, 5, Market Way, Broad Street, Reading, Berkshire RG1 2BN (GB). (81) Designated States: AT (European patent), CH (European patent), DE (European patent), FR (European patent), GB (European patent), LU (European patent), NL (European patent), SE (European patent), US. Published With international search report With amended claims

(54) Title: SWIMMING POOL COVER



(57) Abstract

A swimming pool cover (1) which has a density greater than that of water and which comprises buoyancy chambers (2) which can be filled with air to render the cover (1) buoyant so that it will float on the surface of a pool and from which the air can be exhausted or expelled so as to cause the cover (1) to sink to the bottom of a swimming pool when the swimming pool is required for swimming.

means for inflating the cover and for exhausting or displacing air from the cover.

30. A combination according to claim 11, wherein the pump or blower means is connected or connectable to the cover by way of valve means whereby the cover can be selectively connected to the discharge of the pump or blower means for inflating the cover with air or to the suction side of the pump or blower means for exhausting air from the cover.

31. A combination according to claim 11, comprising a pump and valve means whereby the pump can selectively be operated to pump either air into the cover to inflate the cover or water into the cover to displace the air within the cover.

32. A combination according to claim 11, 12 or 13, wherein manual or automatic control means is provided for controlling said pump or blower means and/or said valve means.

33. A combination according to claim 14, wherein said control means includes a pressure sensitive switch for automatically stopping operation of the pump or blower means when the air pressure in the cover reaches a predetermined maximum.

34. A swimming pool cover according to any one of the preceding claims, comprising chambers or channels adapted to contain air or water and which is so constructed



when a swimming pool is required for use and to replace the cover after the swimming pool has been used.

The present invention has as its object to overcome this problem.

5 The present invention provides a swimming pool cover having a higher density than water, the cover being inflatable with air to render it buoyant so that it will float on the surface of a swimming pool and being so constructed that, after inflation, the air can be
10 exhausted or displaced therefrom so that the cover will sink to the bottom of a swimming pool to leave the pool free for use.

 The swimming pool cover may be formed from a material having a higher density than water or may be
15 formed from a material having a density the same as or lower than that of water and may comprise weights or other suitable means for imparting to the cover as a whole a density higher than that of water.

 The swimming pool cover may be of a laminar
20 construction comprising at least two layers of water and air impermeable material, e.g., a suitable plastics material, the at least two layers being locally welded, bonded or otherwise secured together to define chambers, e.g., extending longitudinally and/or transversely of
25 the cover, which can be inflated with air. Said chambers may intercommunicate so that the cover can be inflated by way of a single air inlet, e.g., an inlet valve.

Preferably, however, said chambers are independant of one another or are in groups which are independant from one another so that should a leak occur in one of the chambers or groups of chambers the cover will retain sufficient
5 buoyancy to remain afloat on the surface of a swimming pool.

Pump or blower means may be provided which is connected or connectable to the swimming pool cover for inflating the cover and for exhausting or displacing
10 air from the cover. The pump or blower means may be connected or connectable to the cover by way of suitable valve means whereby the cover can be selectively connected to the discharge of the pump or blower means for inflating the cover with air and to the suction side of the pump or
15 blower means for exhausting air from the cover.

Alternatively, valve means may be provided whereby the pump can selectively pump either air into the cover to inflate the cover or water into the cover to displace the air within the cover. Suitable manual or automatic control
20 means may be provided for operating said pump or blower means and/or said valve means. Such control means may include a pressure sensitive switch or the like for automatically stopping operation of the pump or blower means when the air pressure in the cover reaches a
25 predetermined maximum. The control means may also include means whereby additional air can be pumped into the

cover at night or during very cold weather to provide additional heat insulation.

If desired the swimming pool cover of the present invention may comprise means for heating the water in a swimming pool. Thus, for example, the cover may, in addition to the chambers aforesaid, comprise channels adapted to contain water and means may be provided for heating the water in said channels. Such heating means may comprise electric resistance heating elements or the upper surface of the cover may comprise one or more solar heating panels adapted to absorb solar energy and heat the water in said channels.

Swimming pools can be of many different shapes and sizes. Covers according to the present invention may be custom made to suit a swimming pool of a particular shape and size or may be made in stock sizes to suit a majority of swimming pools. Preferably, however, covers according to the present invention are made in continuous lengths of a predetermined width or widths which can be cut and shaped, and if necessary joined, to suit a swimming pool of any size and shape, plugs or other suitable means being provided for sealing those chambers, and where appropriate those water channels, which have been cut during cutting and shaping of the cover.

The invention will be more particularly described with reference to the accompanying drawings, in which:-

Figure 1 is a diagrammatic plan view of a swimming pool cover according to the present invention,

Figure 2 is a diagram illustrating how a cover according to the invention can be produced for a shaped swimming pool from standard width cover material.

Figure 3 is a diagrammatic plan view of another embodiment of swimming pool cover according to the present invention, and

Figure 4 is a fragmentary sectional view of part of the cover of Figure 3.

Referring to Figure 1 of the drawings it will be seen that the swimming pool cover 1 is rectangular in shape and comprises a plurality of parallel buoyancy chambers 2 each of which is connected by a flexible conduit 3 to an air line 4 connected to a pump or blower 5 by way of a valve 6.

The valve 6 is such that the buoyancy chambers 2 can be connected to either the discharge or suction side of the pump or blower 5 so that the chambers 2 can be either inflated or deflated as required. Alternatively the arrangement could be such that the chambers 2 could be filled with air or water as required in order to float or sink the swimming pool cover.

The swimming pool cover 1 may be formed in sections of a standard length and/or width which can be secured, e.g., welded, together to provide a swimming pool cover of a required size. Preferably also the

swimming pool cover is such that it can be cut or trimmed to a required size or shape.

Figure 2 illustrates how two standard sections 7, 8 can be welded or otherwise secured together along the line 9 and then trimmed around a line 10 to provide a swimming pool cover 1a of a required size and shape. Preferably the material from which the cover is made is heat-sealable, e.g., is of a suitable thermoplastics material, and is heat sealed around the line 10 to seal the chambers 2a of the sections 7, 8. The chambers 2a may each be connected by flexible conduits (not shown) to an air line in the manner illustrated in Figure 1. Connections for such flexible conduits are indicated at 11.

In the embodiment of Figures 3 and 4 the swimming pool cover comprises a plurality of chambers 12 (only some of which are shown) interconnected by connecting passages 13 whereby the chambers 12 and passages 13 can be inflated by way of a single air line connection 14. In addition the embodiment of Figures 3 and 4 comprises tubular passages 15 which can be filled either with a ballast material to weight the cover and so ensure that it will sink when the air is exhausted or displaced from the chambers 12 and passages 13 or which can be filled with air to provide additional buoyancy or thermal insulation, e.g., at night or during very cold weather.

Alternatively the passages 13 could be adapted to contain or have circulated therethrough heated water in order to heat or maintain the heat in a swimming pool, in which event suitable heating means, e.g., suitable electric resistance or solar heating means, may be provided for heating the water in the passages 13.

It will readily be appreciated that a swimming pool cover according to the present invention completely overcomes the problem associated with known swimming pool covers since there is no need under normal circumstances to remove the cover from the pool. Instead the cover is simply inflated to bring it to the surface and cover the pool when it is required to cover the pool and the air therein is simply exhausted or displaced so that the cover sinks to the bottom of the pool when the pool is required for swimming.

Claims:

1. A swimming pool cover having a higher density than water, the cover being inflatable with air to render it buoyant so that it will float on the surface of a swimming pool and being so constructed that, after inflation, the air can be exhausted or displaced therefrom so that the cover will sink to the bottom of a swimming pool to leave the pool free for use.

2. A swimming pool cover according to claim 1, wherein the cover is formed from a material having a density higher than that of water.

3. A swimming pool cover according to claim 1 or 2, wherein the cover is formed from a material having a density the same as or lower than that of water and wherein means is provided for imparting to the cover as a whole a density higher than that of water.

4. A swimming pool cover according to claim 1, 2 or 3, which is of laminar construction comprising at least two layers of water and air impermeable material, the at least two layers being locally secured together to define chambers which can be inflated with air to render the cover buoyant.

5. A swimming pool cover according to claim 4, wherein said at least two layers comprise heat sealable material and wherein said layers are locally welded together by heat sealing to define said chambers.

6. A swimming pool cover according to claim 4 or 5, wherein at least some of said chambers intercommunicate whereby they can be inflated by way of a single air inlet.

7. A swimming pool cover according to claim 4 or 5, wherein said chambers are independant of one another or are in intercommunicating groups which are independant from one another whereby should a leak occur in one of the chambers or groups of chambers the cover will retain sufficient buoyancy to remain afloat on the surface of a swimming pool.

8. A swimming pool cover according to any one of the preceding claims, comprising one or more chambers or channels adapted to contain water or a ballast material for weighting the swimming pool cover.

9. A swimming pool cover according to claim 8, wherein said one or more chambers or channels are adapted to contain water and wherein means is provided for heating the water in said one or more chambers or channels.

10. A swimming pool cover according to claim 8, wherein said one or more chambers or channels are adapted to contain water and wherein means is provided for supplying heated water to said chambers or channels.

11. A swimming pool cover according to claim 9 or 10, wherein said heating means or means for supplying heated water comprises electric resistance heating means.

12. A swimming pool cover according to claim 9



or 10, wherein said heating means or means for supplying heated water comprises solar heating means.

13. A swimming pool cover according to any one of the preceding claims in combination with pump or blower means for inflating the cover and for exhausting or displacing air from the cover.

14. A combination according to claim 13, wherein the pump or blower means is connected or connectable to the cover by way of valve means whereby the cover can be selectively connected to the discharge of the pump or blower means for inflating the cover with air or to the suction side of the pump or blower means for exhausting air from the cover.

15. A combination according to claim 13, comprising a pump and valve means whereby the pump can selectively be operated to pump either air into the cover to inflate the cover or water into the cover to displace the air within the cover.

16. A combination according to claim 13, 14 or 15, wherein manual or automatic control means is provided for controlling said pump or blower means and/or said valve means.

17. A combination according to claim 16, wherein said control means includes a pressure sensitive switch for automatically stopping operation of the pump or blower means when the air pressure in the cover reaches a predetermined maximum.

18. A swimming pool cover according to any one of the preceding claims, comprising chambers or channels adapted to contain air or water and which is so constructed that it can be cut to a required shape and the said chambers or channels sealed or plugged to render them air or water tight.

AMENDED CLAIMS

(received by the International Bureau on 21 November 1980 (21.11.80))

Original claims 1. to 18. (cancelled)

19. A swimming pool cover having a higher density than water, the cover being inflatable with air to render it buoyant so that it will float on the surface of a swimming pool and being so constructed that, after inflation, the air can be exhausted or displaced therefrom so that the cover will sink to the bottom of a swimming pool to leave the pool free for use, the cover being of laminar construction comprising at least two layers of water and air impermeable heat sealable material, the at least two layers being locally welded together by heat sealing to define chambers which can be inflated with air to render the cover buoyant.

20. A swimming pool cover according to claim 1, wherein the cover is formed from a material having a density higher than that of water.

21. A swimming pool cover according to claim 1 or 2, wherein the cover is formed from a material having a density the same as or lower than that of water and wherein means is provided for imparting to the cover as a whole a density higher than that of water.

22. A swimming pool cover according to claim 1, 2 or 3 wherein at least some of said chambers inter-communicate whereby they can be inflated by way of a single air inlet.



23. A swimming pool cover according to any one of the preceding claims, wherein said chambers are independant of one another or are in intercommunicating groups which are independant from one another whereby should a leak occur in one of the chambers or groups of chambers the cover will retain sufficient buoyancy to remain afloat on the surface of a swimming pool.

24. A swimming pool cover according to any one of the preceding claims, comprising one or more chambers or channels adapted to contain water or a ballast material for weighting the swimming pool cover.

25. A swimming pool cover according to claim 6, wherein said one or more chambers or channels are adapted to contain water and wherein means is provided for heating the water in said one or more chambers or channels.

26. A swimming pool cover according to claim 6, wherein said one or more chambers or channels are adapted to contain water and wherein means is provided for supplying heated water to said chambers or channels.

27. A swimming pool cover according to claim 7, or 8, wherein said heating means or means for supplying heated water comprises electric resistance heating means.

28. A swimming pool cover according to claim 7 or 8, wherein said heating means or means for supplying heated water comprises solar heating means.

29. A swimming pool cover according to any one of the preceding claims in combination with pump or blower



means for inflating the cover and for exhausting or displacing air from the cover.

30. A combination according to claim 11, wherein the pump or blower means is connected or connectable to the cover by way of valve means whereby the cover can be selectively connected to the discharge of the pump or blower means for inflating the cover with air or to the suction side of the pump or blower means for exhausting air from the cover.

31. A combination according to claim 11, comprising a pump and valve means whereby the pump can selectively be operated to pump either air into the cover to inflate the cover or water into the cover to displace the air within the cover.

32. A combination according to claim 11, 12 or 13, wherein manual or automatic control means is provided for controlling said pump or blower means and/or said valve means.

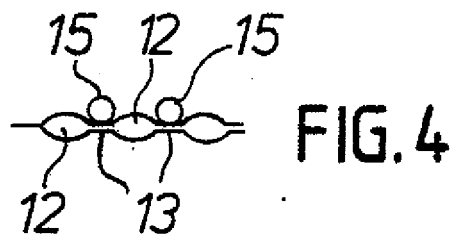
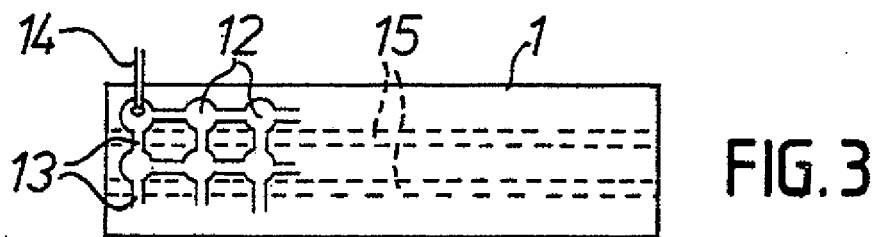
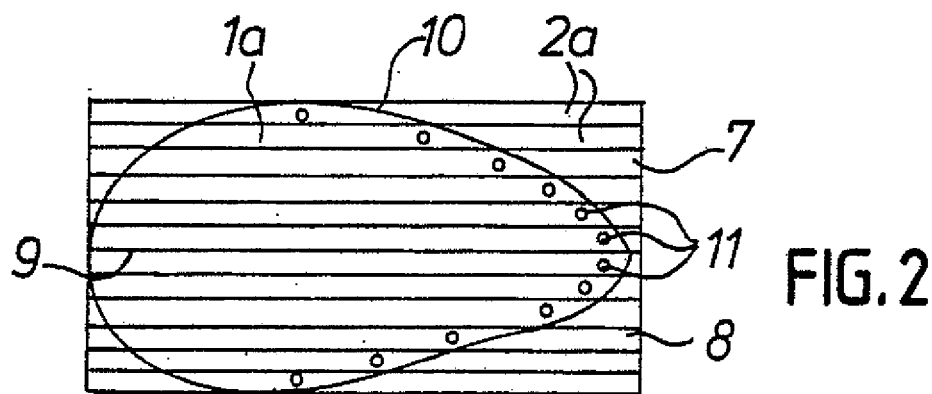
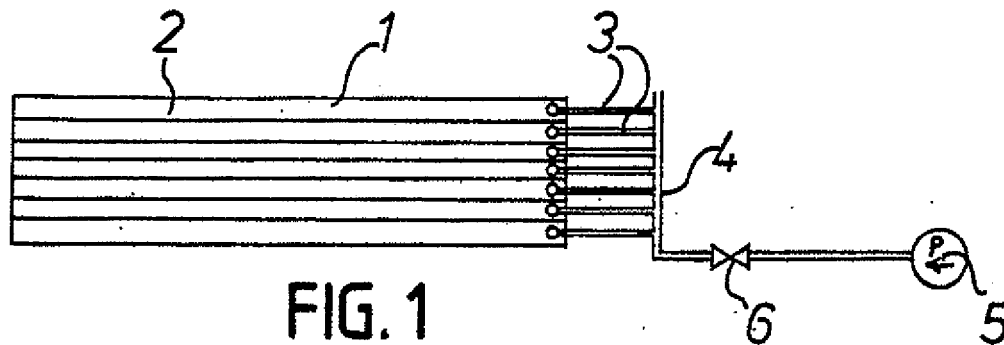
33. A combination according to claim 14, wherein said control means includes a pressure sensitive switch for automatically stopping operation of the pump or blower means when the air pressure in the cover reaches a predetermined maximum.

34. A swimming pool cover according to any one of the preceding claims, comprising chambers or channels adapted to contain air or water and which is so constructed



that it can be cut to a required shape and the said chambers or channels sealed or plugged to render them air or water tight.





INTERNATIONAL SEARCH REPORT

International Application No PCT/GB 80/00114

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) ³ According to International Patent Classification (IPC) or to both National Classification and IPC <div style="text-align: center; font-family: monospace; font-size: 1.2em;">Int.Cl.³ E 04 H 3/19</div>																							
II. FIELDS SEARCHED <div style="text-align: center; font-size: 0.8em;">Minimum Documentation Searched ⁴</div> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%; padding: 5px;">Classification System</td> <td style="padding: 5px;">Classification Symbols</td> </tr> <tr> <td style="padding: 5px;">Int.Cl.³</td> <td style="padding: 5px;">E 04 H</td> </tr> </table> <div style="text-align: center; font-size: 0.8em; margin-top: 10px;">Documentation Searched other than Minimum Documentation to the Extent that such Documents are included in the Fields Searched ⁵</div>			Classification System	Classification Symbols	Int.Cl. ³	E 04 H																	
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III. DOCUMENTS CONSIDERED TO BE RELEVANT ¹⁴ <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%; padding: 5px;">Category [*]</th> <th style="width: 60%; padding: 5px;">Citation of Document, ¹⁶ with indication, where appropriate, of the relevant passages ¹⁷</th> <th style="width: 30%; padding: 5px;">Relevant to Claim No. ¹⁵</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="padding: 5px;">DE, A, 2361725, published June 19, 1975 see page 1, lines 1-30; figures, Bruecher --</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1,3,4,13</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="padding: 5px;">DE, A, 2411364, published September 11, 1975 see page 3, lines 29-35; page 4, lines 1-40; page 5, lines 1-31; page 6, lines 1-11; figures 1-9, Schoenherr --</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1,3,4,6,8, 13,14,15</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="padding: 5px;">DE, A, 2452550, published May 13, 1976 see page 3, lines 33,34; page 4, lines 1-35; page 5, lines 1-34; figures 1,2,3, 4,5,6,7,8, Nitzsche --</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1,3,4,8,13, 14</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="padding: 5px;">DE, A, 2435303, published February 19, 1976 see page 6, lines 1-27; page 7, lines 1-13; figures 1,2,3,4, Krueger --</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1,3,13,14</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="padding: 5px;">FR, A, 2173606, published October 5, 1973 see page 2, lines 34-38; page 3, lines 1-38; page 4, lines 1-32; page 5, lines 31-38; page 6, lines 1-11; figures 1,2, 3,6,7,8, Bartlett --</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1,3,4,6,8, 13,14,16</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="padding: 5px;">US, A, 3513704, published June 4, 1974 see column 3, lines 22-68; column 4,</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1,3,4,6</td> </tr> </tbody> </table>			Category [*]	Citation of Document, ¹⁶ with indication, where appropriate, of the relevant passages ¹⁷	Relevant to Claim No. ¹⁵	X	DE, A, 2361725, published June 19, 1975 see page 1, lines 1-30; figures, Bruecher --	1,3,4,13	X	DE, A, 2411364, published September 11, 1975 see page 3, lines 29-35; page 4, lines 1-40; page 5, lines 1-31; page 6, lines 1-11; figures 1-9, Schoenherr --	1,3,4,6,8, 13,14,15	X	DE, A, 2452550, published May 13, 1976 see page 3, lines 33,34; page 4, lines 1-35; page 5, lines 1-34; figures 1,2,3, 4,5,6,7,8, Nitzsche --	1,3,4,8,13, 14	X	DE, A, 2435303, published February 19, 1976 see page 6, lines 1-27; page 7, lines 1-13; figures 1,2,3,4, Krueger --	1,3,13,14	X	FR, A, 2173606, published October 5, 1973 see page 2, lines 34-38; page 3, lines 1-38; page 4, lines 1-32; page 5, lines 31-38; page 6, lines 1-11; figures 1,2, 3,6,7,8, Bartlett --	1,3,4,6,8, 13,14,16	X	US, A, 3513704, published June 4, 1974 see column 3, lines 22-68; column 4,	1,3,4,6
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<div style="font-size: 0.8em;"> [*] Special categories of cited documents: ¹⁵ <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>"A" document defining the general state of the art</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document cited for special reason other than those referred to in the other categories</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> </div> <div style="width: 45%;"> <p>"P" document published prior to the international filing date but on or after the priority date claimed</p> <p>"T" later document published on or after the international filing date or priority date and not in conflict with the application, but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance</p> </div> </div> </div>																							
IV. CERTIFICATION <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;"> Date of the Actual Completion of the International Search ¹ <div style="text-align: center; font-family: monospace;">29th September 1980</div> </td> <td style="width: 50%; padding: 5px;"> Date of Mailing of this International Search Report ² <div style="text-align: center; font-family: monospace;">7th October 1980</div> </td> </tr> <tr> <td style="width: 50%; padding: 5px;"> International Searching Authority ¹ <div style="text-align: center; font-family: monospace;">European Patent Office</div> </td> <td style="width: 50%; padding: 5px;"> Signature of Authorized Officer ¹⁰ <div style="text-align: center; font-family: monospace;">G.L.M. Kruidenberg</div> <div style="text-align: right; font-size: 1.5em; margin-top: -20px;"> </div> </td> </tr> </table>			Date of the Actual Completion of the International Search ¹ <div style="text-align: center; font-family: monospace;">29th September 1980</div>	Date of Mailing of this International Search Report ² <div style="text-align: center; font-family: monospace;">7th October 1980</div>	International Searching Authority ¹ <div style="text-align: center; font-family: monospace;">European Patent Office</div>	Signature of Authorized Officer ¹⁰ <div style="text-align: center; font-family: monospace;">G.L.M. Kruidenberg</div> <div style="text-align: right; font-size: 1.5em; margin-top: -20px;"> </div>																	
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III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
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X	lines 1-68; figures 1,2,3,4,5,6,7,10; Troiano --	
	DE, A, 2406441, published August 21, 1975 see page 13, lines 23-26; page 14, lines 1-34; page 15, lines 1-29; figures 1,2, 3,4, Kollman --	1,3,6,13
	DE, A, 2100716, published July 22, 1971 see page 13, lines 11-26; page 14, lines 3-25; page 15, lines 1-20; page 16, lines 18-25; figures 1-8, 9-12, Schwarz -----	1,2,3,7